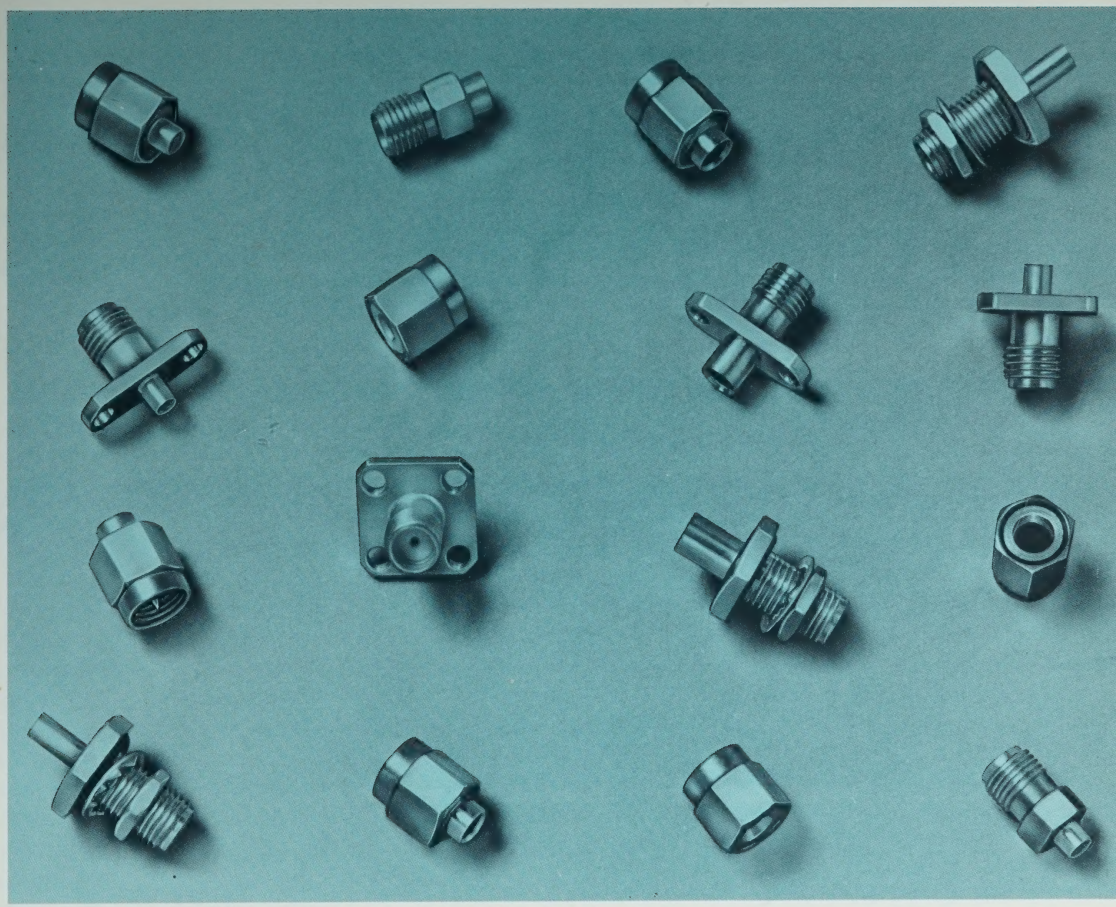
SMA CONNECTORS



UTI | micro-COAX™
COMPONENTS, Inc.

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MICRO-COAX COMPONENTS, INC.

Box E, 245 West 5th Avenue, Collegeville, PA 19426, USA • Telephone: 215/489-3700
Domestic ELN (TLX): 62961019 • International Telex: 84-6428 • Facsimile Number: 215/489-1103

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introduction

Quality is the basic business principle at Micro-Coax Components, Inc. Providing innovative products and services that fully satisfy customer requirements and expectations is our number one priority. To achieve these results we emphasize the use of statistical process control techniques (SPC) to provide control, evidence of consistent product and continued quality improvement.

Micro-Coax Components, Inc.'s Series SMA connectors are available for 0.0865" (2.20mm) and 0.141" (3.58mm) diameter semi-rigid cable and meet or exceed MIL-C-39012 specifications. Both male and female connectors are available in the frequency range of DC to 26.5 GHz.

Micro-Coax Connectors offer greater control of electrical and mechanical uniformity with added temperature capability of -54° to 125° C.

The following are the descriptions and model numbers of Micro-Coax SMA connectors currently available:

STANDARD			MIL-C-39012 QPL		
Description	**Part Number**	**Page #**	**Description**	**Part Number**	**Page #**
straight cable plug	11-SMA-50-2-301	6	M39012/79-3001	11-SMA-50-2-203	6
straight cable plug	11-SMA-50-2-302	6	M39012/79-3001	11-SMA-50-2-215	6
straight cable plug	11-SMA-50-3-301	6	M39012/79-3101	11-SMA-50-2-202	6
straight cable plug	11-SMA-50-3-302	6	M39012/79-3101	11-SMA-50-2-201	6
straight cable plug	11-SMA-50-3-303	6	M39012/79-3002	11-SMA-50-3-207	6
straight cable plug	11-SMA-50-3-304	6	M39012/79-3102	11-SMA-50-3-201	6
cable jack	21-SMA-50-2-101	7	M39012/92-3001	11-SMA-50-3-206	6
cable jack	21-SMA-50-3-101	7	M39012/92-3001	11-SMA-50-3-222	6
bulk head jack	24-SMA-50-2-101	7	M39012/92-3101	11-SMA-50-3-202	6
bulk head jack	24-SMA-50-3-101	7	M39012/92-3101	11-SMA-50-3-203	6
panel jack	25-SMA-50-2-102	8			
panel jack	25-SMA-50-2-104	8			
panel jack	25-SMA-50-3-102	8			
panel jack	25-SMA-50-3-104	8			
right angle	UT®85-049	9			
right angle	UT®141A-049	9			

Specifications subject to change without notice.
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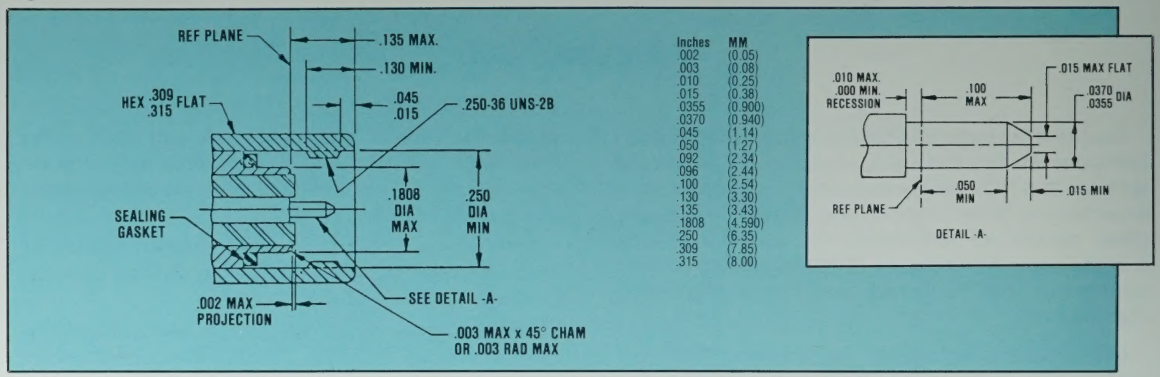
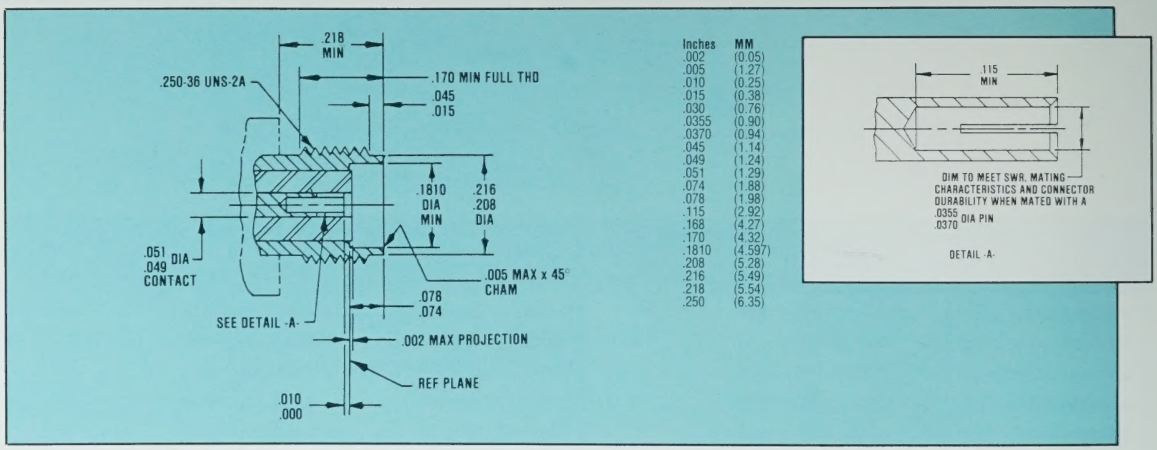
interface dimensions per MIL-C-39012

Figure 1 - Pin contact



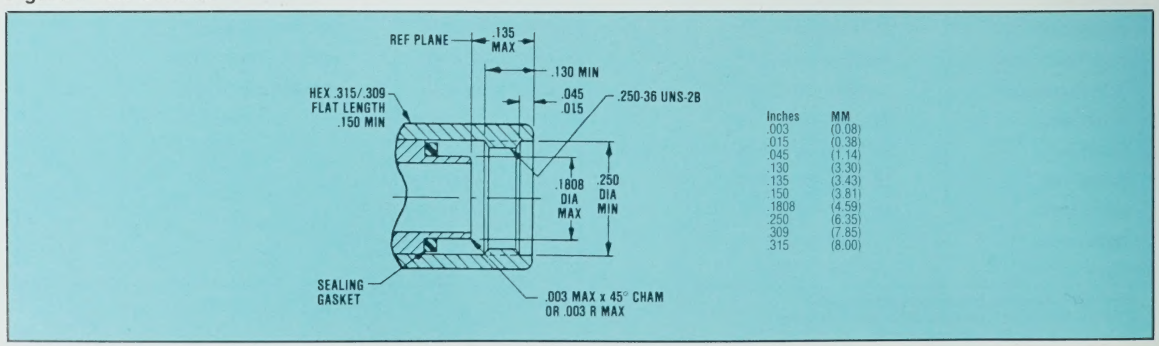
Inches	MM
.002	(0.05)
.003	(0.08)
.010	(0.25)
.015	(0.38)
.0355	(0.900)
.0370	(0.940)
.045	(1.14)
.050	(1.27)
.092	(2.34)
.096	(2.44)
.100	(2.54)
.130	(3.30)
.135	(3.43)
.1808	(4.590)
.250	(6.35)
.309	(7.85)
.315	(8.00)

Figure 2 - Socket contact



Inches	MM
.002	(0.05)
.005	(1.27)
.010	(0.25)
.015	(0.38)
.030	(0.76)
.0355	(0.90)
.0370	(0.94)
.045	(1.14)
.049	(1.24)
.051	(1.29)
.074	(1.88)
.078	(1.98)
.115	(2.92)
.168	(4.27)
.170	(4.32)
.1810	(4.597)
.208	(5.28)
.216	(5.49)
.218	(5.54)
.250	(6.35)

Figure 3 - No contact



Inches	MM
.003	(0.08)
.015	(0.38)
.045	(1.14)
.130	(3.30)
.135	(3.43)
.150	(3.81)
.1808	(4.59)
.250	(6.35)
.309	(7.85)
.315	(8.00)

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specifications

materials

Body parts: Stainless steel per QQ-S-764, Type 303, Condition A.
Center contacts: Beryllium copper per QQ-C-530, Condition HT.
Dielectrics: Solid PTFE per ASTM D-1457.
Gaskets: Silicone rubber per ZZ-R-765, Class 2B, Grade 70.

finish

Bodies and center contacts: Gold plate per MIL-G-45204, Type II, Class 1, over nickle plate per QQ-N-290, Class 2.

electricals

Insulation resistance: 5000 megohms minimum.
Dielectric withstanding voltage: 1000 VAC RMS @ sea level UT®85; 1500 VAC RMS @ sea level UT®141A.
RF high potential withstanding voltage: 670 volts RMS @ 5 MHz UT®85; 1000 volts RMS @ 5 MHz UT®141A.
Contact resistance: center contact 3.0 milliohms maximum; outer contact 2.0 milliohms maximum.
Nominal impedance: 50 ohms.
Frequency Range: 0-26.5 GHz.
SWR: UT®85 - Male - 1.05+ .006f (GHz).
Female - 1.05+ .006f (GHz).
UT®141 - Male with pin - 1.05+ .006f (GHz).
Male pinless - 1.035+ .005f (GHz).
Female - 1.05+ .006f (GHz).

Insertion loss: $.003\sqrt{f(\text{GHz})}$ maximum.
RF leakage: -90dB minimum from 2 to 3 GHz.

mechanical*

Force to engage and disengage: Torque 2 inch - pounds maximum; longitudinal force - N/A.
Coupling nut retention force: Female connectors -N/A; Male connectors - 100 lbs. minimum.
Cable retention force: UT®85 - 30 lbs. minimum; UT®141A - 60 lbs. minimum.
Recommended mating torque: 7-10 inch - pounds.
Mating characteristics: per MIL-STD-348. (Fig. 1, 2, and 3).
Connector durability: 500 mating/unmating cycles minimum.

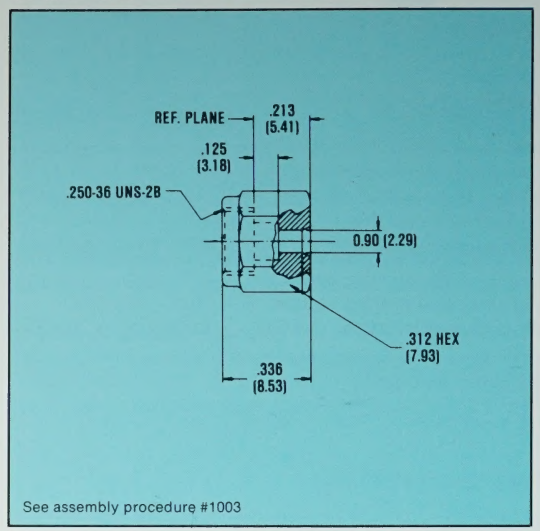
environmental

Vibration: (per MIL-STD-202) method 204, test condition D.
Shock: (per MIL-STD-202) method 213, test condition I.
Corrosion (salt spray): (per MIL-STD-202) method 101, test condition B @ 5% salt solution for 48 hours.
Moisture resistance: (per MIL-STD-202) method 106, Step 7b (vibration) omitted.
Corona level: altitude 70,000 ft.
UT®85 - 250 VRMS minimum.
UT®141A - 375 VRMS minimum.
Operating temperature: -54° C to 125° C.

* Specifications to apply when connector is mated in accordance with the specifications of MIL-STD-348.

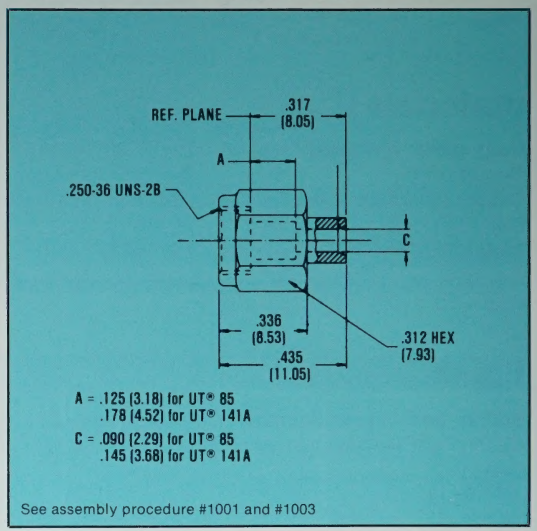
straight cable plug

Figure 4 (UT®85) 11 SMA-50-2-301
11 SMA-50-2-215 • 11 SMA-50-2-201



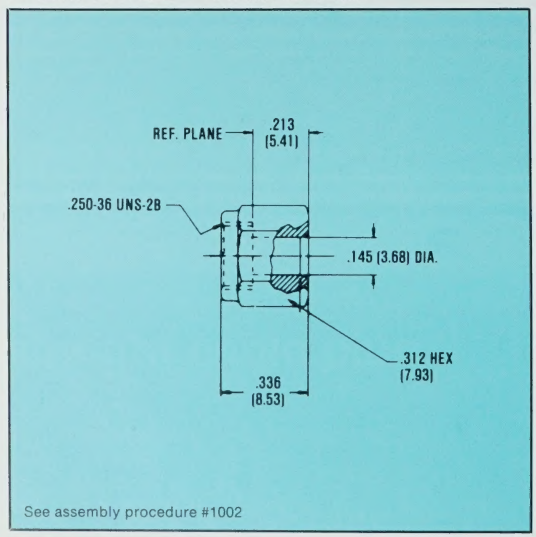
See assembly procedure #1003

Figure 5 (UT®85) 11 SMA-50-2-302
11 SMA-50-2-203 • 11 SMA-50-2-202
(UT®141A) 11 SMA-50-3-301
11 SMA-50-3-207 • 11 SMA-50-3-201



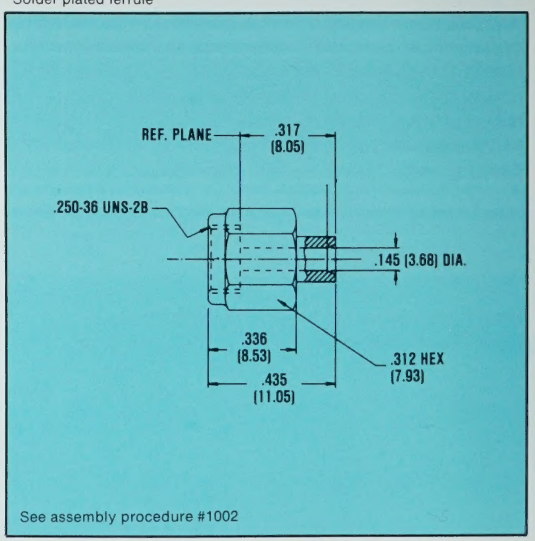
See assembly procedure #1001 and #1003

Figure 6 (UT®141A) 11 SMA-50-3-303
11 SMA-50-3-222 • 11 SMA-50-3-203



See assembly procedure #1002

Figure 7 (UT®141A) 11 SMA-50-3-302
11 SMA-50-3-304* • 11 SMA-50-3-206
11 SMA-50-3-202
*Solder plated ferrule



See assembly procedure #1002

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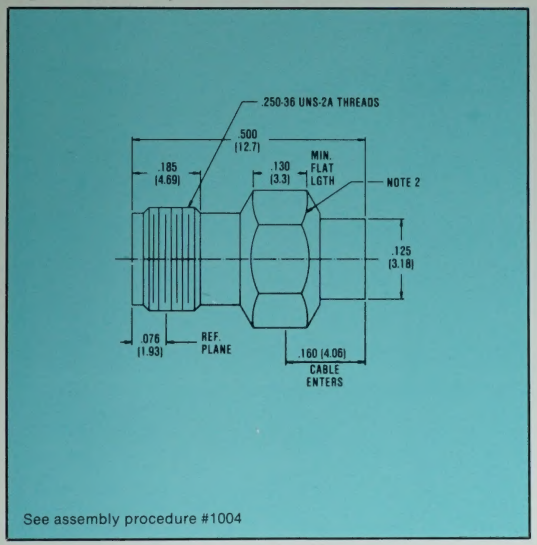
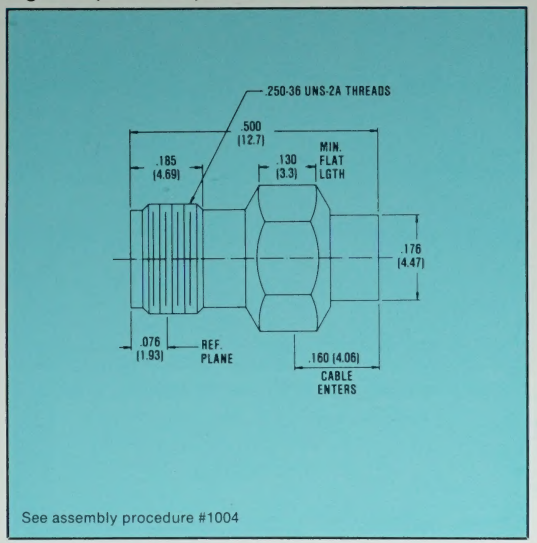
cable jack

Figure 8 (UT®85) 21 SMA-50-2-101



See assembly procedure #1004

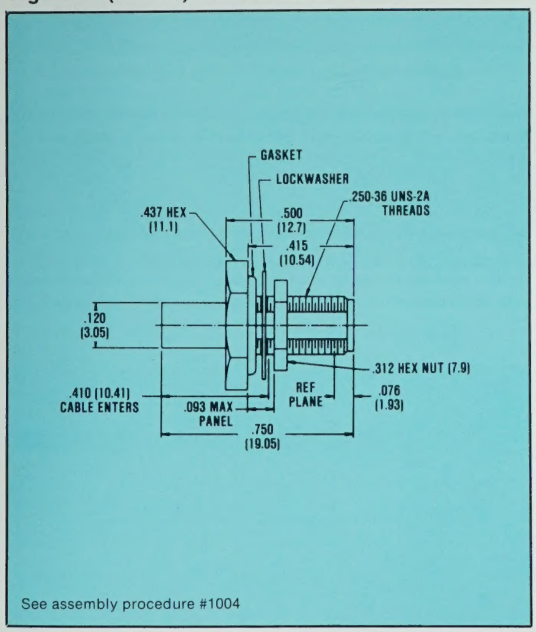
Figure 9 (UT®141A) 21 SMA-50-3-101



See assembly procedure #1004

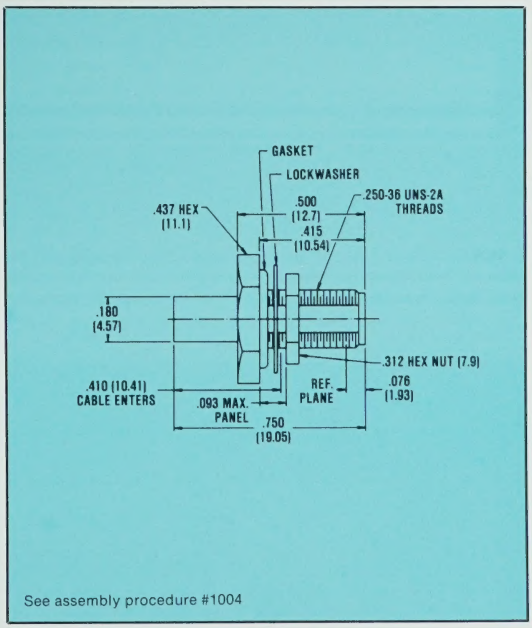
bulk head jack

Figure 10 (UT®85) 24 SMA-50-2-101



See assembly procedure #1004

Figure 11 (UT®141A) 24 SMA-50-3-101



See assembly procedure #1004

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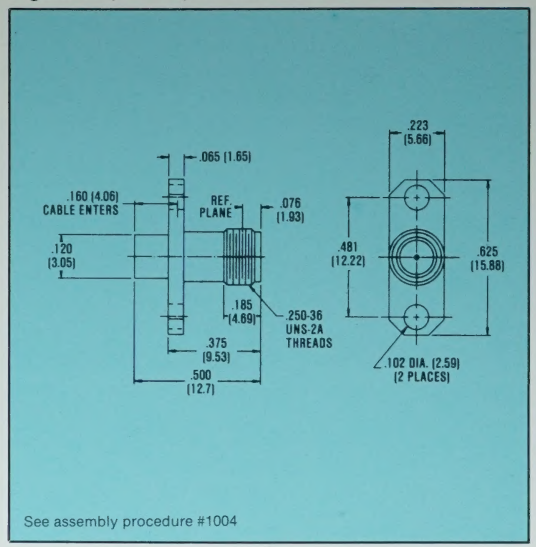
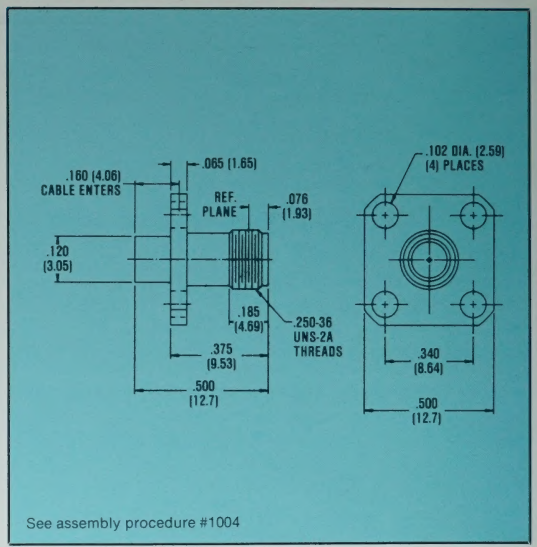
panel jack

Figure 12 (UT®85) 25 SMA-50-2-102



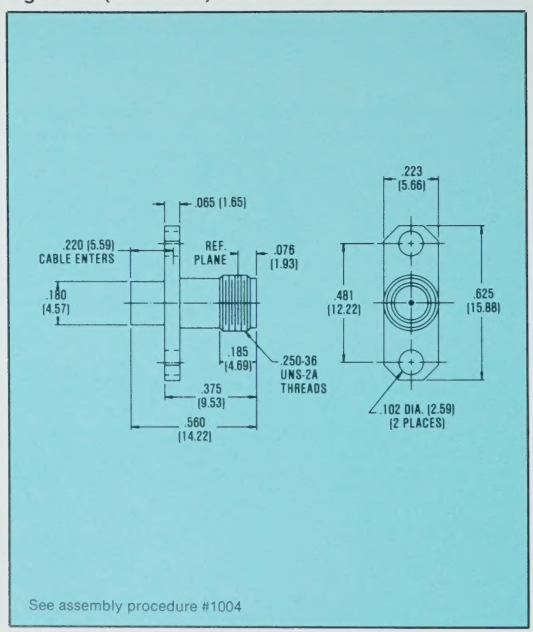
See assembly procedure #1004

Figure 13 (UT®85) 25 SMA-50-2-104



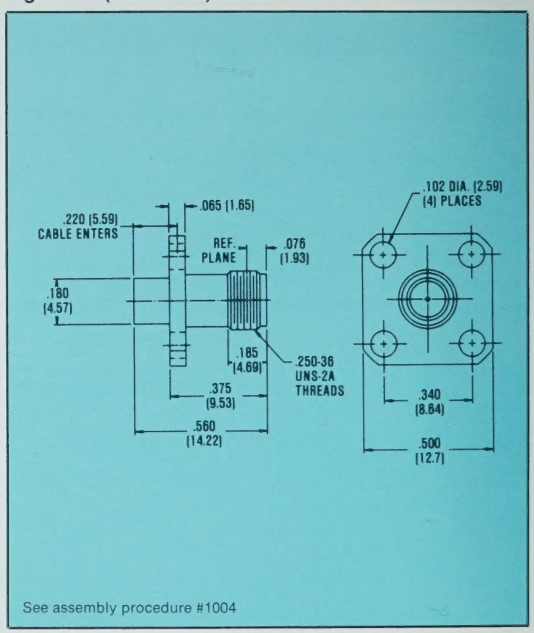
See assembly procedure #1004

Figure 14 (UT®141A) 25 SMA-50-3-102



See assembly procedure #1004

Figure 15 (UT®141A) 25 SMA-50-3-104



See assembly procedure #1004

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right angle connector assembly

Figure 16 - UT®85-049

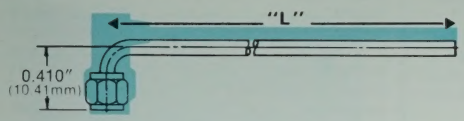
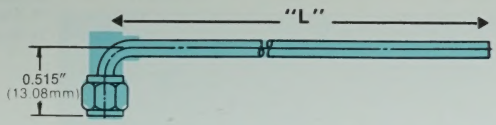


Figure 17 - UT®141A-049



Micro-Coax Assembly Number Plus	Cable Finish	"L" Inches (mm)
-005	—	6 (152.4)
-006	TP	6 (152.4)
-011	—	12 (304.8)
-012	TP	12 (304.8)
-017	—	18 (457.4)
-018	TP	18 (457.4)
-023	—	24 (609.6)
-024	TP	24 (609.6)
-029	—	48 (1219)
-030	TP	48 (1219)

Micro-Coax right angle connector assemblies are an economical replacement for conventional right angle connectors as shown in the blue silhouette.

cross reference information

Micro-Coax Components, Inc.	Omni Spectra	Sealectro	Amphenol	Solitron
11 SMA 50-2-301	2001-5009-02	—	—	—
11 SMA 50-2-302	2001-5032-02	55-607-9172-89	901-9201-2A	2906-6002
21 SMA 50-2-101	2002-5016-00	55-608-9182-31	901-3325	2921-6002
24 SMA 50-2-101	2004-7985-00	55-610-9172-31	901-9210-2	2946-6001
25 SMA 50-2-102	2006-5010-00	55-604-9272-31	901-9246-2	2933-6001
25 SMA 50-2-104	2006-5012-00	55-604-9172-31	901-9206-2	2933-6004
11 SMA 50-3-301	2001-5003-02	55-607-9173-89	901-9207-1	2902-6005
11 SMA 50-3-302	2001-5031-02	55-607-2003-89	901-9201-1A	2902-6007
11 SMA 50-3-303	2001-7941-02	55-607-3703-89	901-B5502-738	2902-6001
11 SMA 50-3-304	—	—	—	—
21 SMA 50-3-101	2002-5015-00	55-608-9183-31	901-3326	2292-6007
24 SMA 50-3-101	2004-7941-00	55-610-9173-31	901-9210-1	2942-6001
25 SMA 50-3-102	2006-5013-00	55-604-9273-31	901-9246-1	2932-6032
25 SMA 50-3-104	2006-7941-00	55-604-9173-31	901-9206-1	2932-6001
UT®85 - 049	2007-7985-00	55-611-3702-31	901-136	2915-6001
UT®141A - 049	2007-7941-00	55-611-3703-31	901-142	2912-6001

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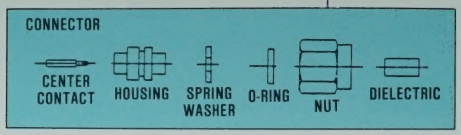
assembly procedure 1001

cable type:
.141" diameter (3.6mm) UT®141A
Semi-rigid coaxial cable

connector type:
SMA Straight Cable
Direct solder attachment
11-SMA-50-3-301
11-SMA-50-3-201
11-SMA-50-3-207

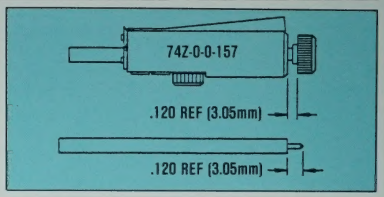
tools required:

cable stripping tool	No. 74Z-0-0-157
soldering fixture	No. 74Z-0-0-58
locator tool	No. 74Z-0-0-107
inserts	No. 74Z-0-0-59
spacer	No. 74Z-0-0-55
tip trimmer	No. 74Z-0-0-64
contact holder	No. 74Z-0-0-54
dielectric insert tool	No. 74Z-0-0-52
positioner	No. 74Z-0-0-81



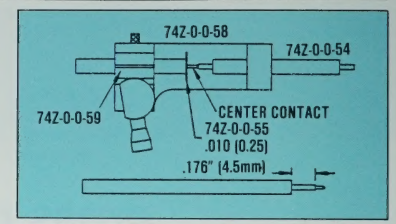
assembly operations - cable preparation:

1. Set cable stripping tool for .120" (3.05mm) stripping dimension. See assembly procedure No. 9054 for detailed operation.
2. Insert squared cable end into stripping tool and rotate cable to score outer jacket.
3. Break and strip off outer jacket.
4. Cut dielectric flush with end of outer jacket and remove using blade (avoid nicking inner conductor).
5. Deburr inner conductor using tip trimmer and positioner.



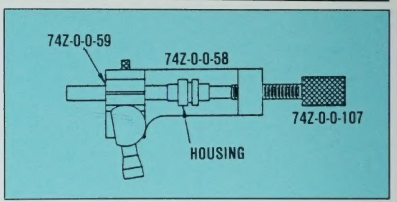
soldering of center contact to cable inner conductor:

1. Tin cable inner conductor with solder.
2. Place center contact into contact holder and tin inner diameter.
3. Using inserts, fix cable in soldering fixture as illustrated.
4. Place spacer on inner conductor flush with end of outer conductor.
5. Heat center contact and push it over inner conductor of cable to butt firmly against spacer. Use contact holder for this operation.
6. Remove spacer and excess solder.
7. Check dimension from end of outer conductor to end of center contact shoulder. .176" (4.5mm).



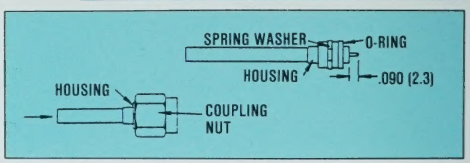
soldering of cable to connector housing:

1. Slide connector housing over end of cable subassembly.
2. Tighten loose assembly into fixture as shown.
3. Nest center contact in locator tool and tighten locator tool fully against cable.
4. Slide connector housing completely against locator tool and keep in this position. Note: It is best to clamp fixture vertically in a vise to ensure that housing remains against locator tool.
5. Solder connector housing to cable. Avoid excessive heat. Immediately cool down and clean with alcohol.



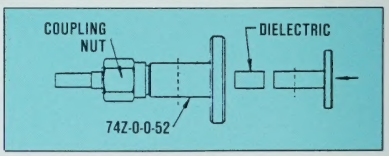
mounting of coupling nut:

1. Check dimension from end of housing to end of center contact. .090" (2.3mm).
2. Mount o-ring gasket on connector housing.
3. Mount retaining spring washer on connector housing.
4. Press coupling nut onto connector housing until spring washer engages.



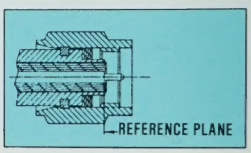
insertion of dielectric bushing into connector housing:

1. Assure housing cavity is clean and dry.
2. Thread dielectric insert tool onto connector housing.
3. Place dielectric into rear opening of insert tool.
4. Using plunger, press dielectric fully through insert tool and into connector. Press until flange bottoms on tool housing.



inspect interface dimensions:

1. Center contact protrusion from reference plane to be .100" (2.54mm) maximum.
2. Dielectric with respect to reference plane to protrude no more than .002" (.05mm).
3. Center contact shoulder with respect to reference plane to protrude or recess no more than .010" (.25mm).

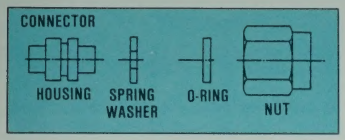


MICRO-COAX COMPONENTS, INC.

Box E, 245 West 5th Avenue, Collegeville, PA 19426, USA • Telephone: 215/489-3700
Domestic ELN (TLX): 62961019 • International Telex: 84-6428 • Facsimile Number: 215/489-1103

assembly procedure 1002

cable type:
.141" diameter (3.6mm) UT®141A
Semi-rigid coaxial cable



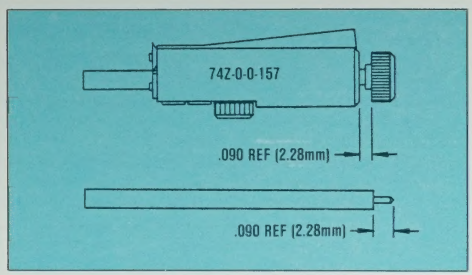
connector type:
SMA Straight Cable
Direct solder attachment
11-SMA-50-3-302
11-SMA-50-3-303
11-SMA-50-3-304
11-SMA-50-3-202
11-SMA-50-3-203
11-SMA-50-3-206
11-SMA-50-3-222

tools required:

cable stripping tool	No. 74Z-0-0-157
soldering fixture	No. 74Z-0-0-58
locator tool	No. 74Z-0-0-62
inserts	No. 74Z-0-0-59
tip trimmer	No. 74Z-0-0-64
positioner	No. 74Z-0-0-81

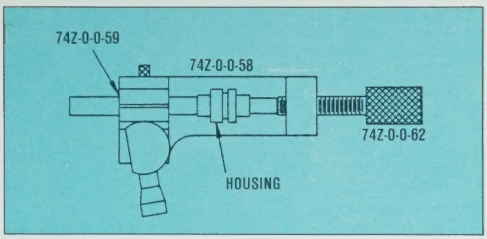
assembly operations - cable preparation:

1. Set cable stripping tool for .090" (2.28mm) stripping dimension. See assembly procedure No. 9054 for detailed operation.
2. Insert squared cable end into stripping tool and rotate cable to score outer jacket.
3. Break and strip off outer jacket.
4. Cut dielectric flush with end of outer jacket and remove using blade (avoid nicking inner conductor).
5. Deburr inner conductor using tip trimmer and positioner. Form tip of inner conductor to a 90° cone.



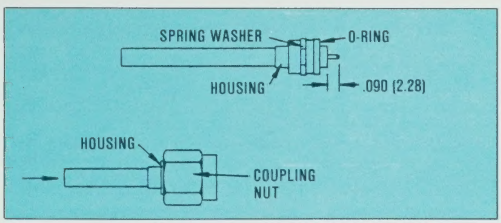
soldering of cable to connector housing:

1. Slide connector housing over end of cable subassembly.
2. Tighten loose assembly into fixture as shown.
3. Nest center contact in locator tool and tighten locator tool fully against cable.
4. Slide connector housing completely against locator tool and keep in this position. Note: It is best to clamp fixture vertically in a vise to ensure that housing remains against locator tool.
5. Solder connector housing to cable. Avoid excessive heat. Immediately cool down and clean with alcohol.



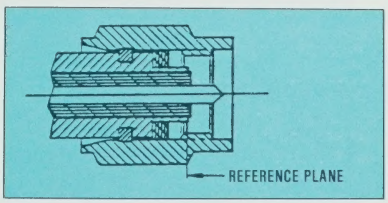
mounting of coupling nut:

1. Check dimension from end of housing to end of center contact. .090" (2.28mm).
2. Mount o-ring gasket on connector housing.
3. Mount retaining spring washer on connector housing.
4. Press coupling nut onto connector housing until spring washer engages.



inspect interface dimensions:

1. Center contact protrusion from reference plane to be .100" (2.54mm) maximum.
2. Dielectric with respect to reference plane to protrude no more than .002" (.05mm).
3. Center contact shoulder with respect to reference plane to protrude or recess no more than .010" (.25mm).



MICRO-COAX COMPONENTS, INC.

Box E, 245 West 5th Avenue, Collegeville, PA 19426, USA • Telephone: 215/489-3700
Domestic ELN (TLX): 62961019 • International Telex: 84-6428 • Facsimile Number: 215/489-1103

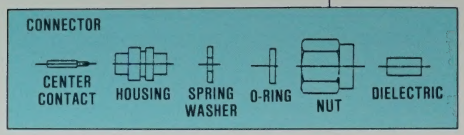
assembly procedure 1001

cable type:
.141" diameter (3.6mm) UT®141A
Semi-rigid coaxial cable

connector type:
SMA Straight Cable
Direct solder attachment
11-SMA-50-3-301
11-SMA-50-3-201
11-SMA-50-3-207

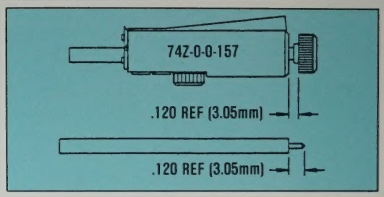
tools required:

cable stripping tool	No. 74Z-0-0-157
soldering fixture	No. 74Z-0-0-58
locator tool	No. 74Z-0-0-107
inserts	No. 74Z-0-0-59
spacer	No. 74Z-0-0-55
tip trimmer	No. 74Z-0-0-64
contact holder	No. 74Z-0-0-54
dielectric insert tool	No. 74Z-0-0-52
positioner	No. 74Z-0-0-81



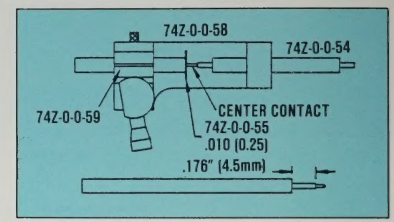
assembly operations - cable preparation:

1. Set cable stripping tool for .120" (3.05mm) stripping dimension. See assembly procedure No. 9054 for detailed operation.
2. Insert squared cable end into stripping tool and rotate cable to score outer jacket.
3. Break and strip off outer jacket.
4. Cut dielectric flush with end of outer jacket and remove using blade (avoid nicking inner conductor).
5. Deburr inner conductor using tip trimmer and positioner.



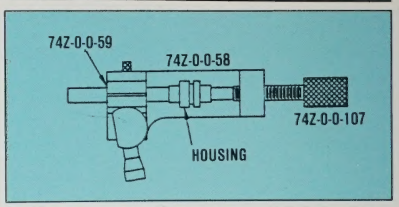
soldering of center contact to cable inner conductor:

1. Tin cable inner conductor with solder.
2. Place center contact into contact holder and tin inner diameter.
3. Using inserts, fix cable in soldering fixture as illustrated.
4. Place spacer on inner conductor flush with end of outer conductor.
5. Heat center contact and push it over inner conductor of cable to butt firmly against spacer. Use contact holder for this operation.
6. Remove spacer and excess solder.
7. Check dimension from end of outer conductor to end of center contact shoulder. .176" (4.5mm).



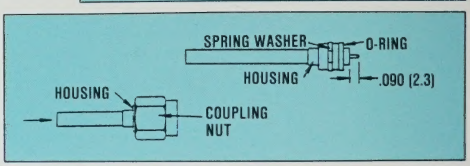
soldering of cable to connector housing:

1. Slide connector housing over end of cable subassembly.
2. Tighten loose assembly into fixture as shown.
3. Nest center contact in locator tool and tighten locator tool fully against cable.
4. Slide connector housing completely against locator tool and keep in this position. Note: It is best to clamp fixture vertically in a vise to ensure that housing remains against locator tool.
5. Solder connector housing to cable. Avoid excessive heat. Immediately cool down and clean with alcohol.



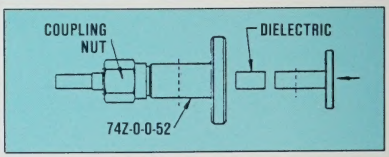
mounting of coupling nut:

1. Check dimension from end of housing to end of center contact. .090" (2.3mm).
2. Mount o-ring gasket on connector housing.
3. Mount retaining spring washer on connector housing.
4. Press coupling nut onto connector housing until spring washer engages.



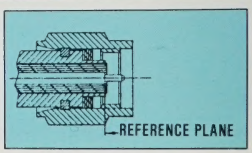
insertion of dielectric bushing into connector housing:

1. Assure housing cavity is clean and dry.
2. Thread dielectric insert tool onto connector housing.
3. Place dielectric into rear opening of insert tool.
4. Using plunger, press dielectric fully through insert tool and into connector. Press until flange bottoms on tool housing.



inspect interface dimensions:

1. Center contact protrusion from reference plane to be .100" (2.54mm) maximum.
2. Dielectric with respect to reference plane to protrude no more than .002" (.05mm).
3. Center contact shoulder with respect to reference plane to protrude or recess no more than .010" (.25mm).



MICRO-COAX COMPONENTS, INC.

Box E, 245 West 5th Avenue, Collegeville, PA 19426, USA • Telephone: 215/489-3700
Domestic ELN (TLX): 62961019 • International Telex: 84-6428 • Facsimile Number: 215/489-1103

assembly procedure 1003

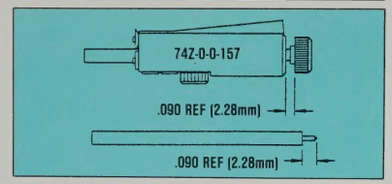
cable type:
.0865" diameter (2.2mm) UT®85
Semi-rigid coaxial cable

connector type:
SMA Straight Cable
Direct solder attachment
11-SMA-50-2-301
11-SMA-50-2-302
11-SMA-50-2-201
11-SMA-50-2-202
11-SMA-50-2-203
11-SMA-50-2-215

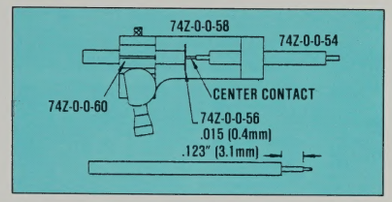
tools required:

cable stripping tool	No. 74Z-0-0-157
soldering fixture	No. 74Z-0-0-58
locator tool	No. 74Z-0-0-108
inserts	No. 74Z-0-0-60
spacer	No. 74Z-0-0-56
contact holder	No. 74Z-0-0-54
dielectric insert tool	No. 74Z-0-0-52

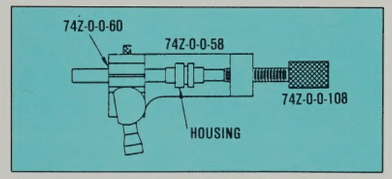
assembly operations - cable preparation:
1. Set cable stripping tool for .090" (2.28mm) stripping dimension. See assembly procedure No. 9054 for detailed operation.
2. Insert squared cable end into stripping tool and rotate cable to score outer jacket.
3. Break and strip off outer jacket.
4. Cut dielectric flush with end of outer jacket and remove using blade (avoid nicking inner conductor).



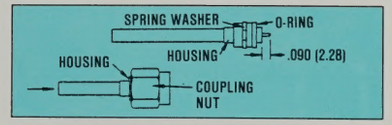
soldering of center contact to cable inner conductor:
1. Tin cable inner conductor with solder.
2. Place center contact into contact holder and tin inner diameter.
3. Using inserts, fix cable in soldering fixture as illustrated.
4. Place spacer on inner conductor flush with end of outer conductor.
5. Heat center contact and push it over inner conductor of cable to butt firmly against spacer. Use contact holder for this operation.
6. Remove spacer and excess solder.
7. Check dimension from end of outer conductor to end of center contact. 123" (3.1mm).



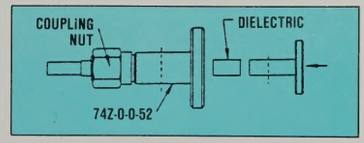
soldering of cable to connector housing:
1. Slide connector housing over end of cable subassembly.
2. Tighten loose assembly into fixture as shown.
3. Nest center contact in locator tool and tighten locator tool fully against cable.
4. Slide connector housing completely against locator tool and keep in this position. Note: It is best to clamp fixture vertically in a vise to ensure that housing remains against locator tool.
5. Solder connector housing to cable. Avoid excessive heat. Immediately cool down and clean with alcohol.



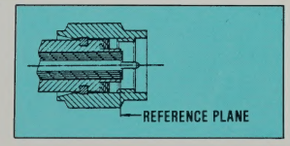
mounting of coupling nut:
1. Check dimension from end of housing to end of center contact. .090" (2.28mm).
2. Mount o-ring gasket on connector housing.
3. Mount retaining spring washer on connector housing.
4. Press coupling nut onto connector housing until spring washer engages.



insertion of dielectric bushing into connector housing:
1. Assure housing cavity is clean and dry.
2. Thread dielectric insert tool onto connector housing.
3. Place dielectric into rear opening of insert tool.
4. Using plunger, press dielectric fully through insert tool and into connector. Press until flange bottoms on tool housing.



inspect interface dimensions:
1. Center contact protrusion from reference plane to be .100" (2.54mm) maximum.
2. Dielectric with respect to reference plane to protrude no more than .002" (.05mm).
3. Center contact shoulder with respect to reference plane to protrude or recess no more than .010" (.25mm).



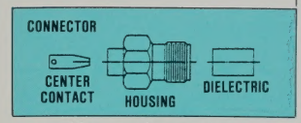
assembly procedure 1004

cable type:
.0865" diameter (2.2mm) UT®85
.141" diameter (3.6mm) UT®141A
Semi-rigid coaxial cable

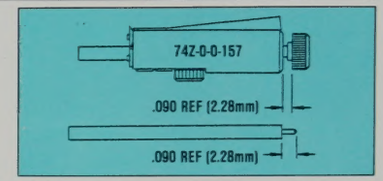
connector type:
SMA Straight Cable
Direct solder attachment
21-SMA-50-2-101
24-SMA-50-2-101
25-SMA-50-2-102
25-SMA-50-2-104 (UT®85)
21-SMA-50-3-101
24-SMA-50-3-101
25-SMA-50-3-102
25-SMA-50-3-104 (UT®141A)

tools required:

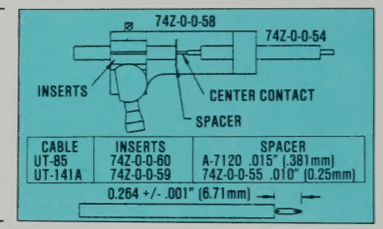
cable stripping tool	No. 74Z-0-0-157
soldering fixture	No. 74Z-0-0-58
locator tool	No. 74Z-0-0-61
inserts	See below
spacer	See below
tip trimmer	No. 74Z-0-0-64
contact holder	No. 74Z-0-0-54
dielectric insert tool	No. 74Z-0-0-53
positioner	No. 74Z-0-0-81



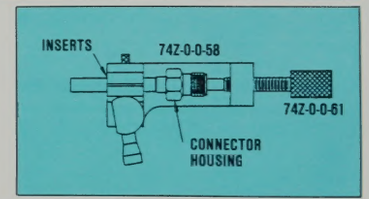
assembly operations - cable preparation:
1. Set cable stripping tool for .090" (2.28mm) stripping dimension. See assembly procedure No. 9054 for detailed operation.
2. Insert squared cable end into stripping tool and rotate cable to score outer jacket.
3. Break and strip off outer jacket.
4. Cut dielectric flush with end of outer jacket and remove using blade (avoid nicking inner conductor).
5. Deburr inner conductor using tip trimmer and positioner.



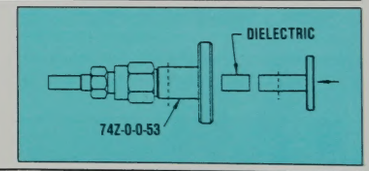
soldering of center contact to cable inner conductor:
1. Tin cable inner conductor with solder.
2. Place center contact into contact holder and tin inner diameter.
3. Using inserts, fix cable in soldering fixture as illustrated.
4. Place spacer on inner conductor flush with end of outer conductor.
5. Heat center contact and push it over inner conductor of cable to butt firmly against spacer. Use contact holder for this operation.
6. Remove spacer and excess solder.
7. Check dimension from end of outer conductor to end of center contact. 0.264" (6.71mm).



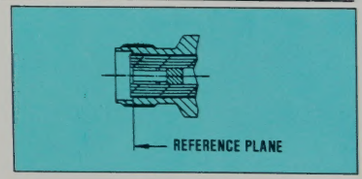
soldering of cable to connector housing:
1. Slide connector housing over end of cable subassembly.
2. Tighten loose assembly into fixture as shown.
3. Nest center contact in locator tool and tighten locator tool fully against cable.
4. Slide connector housing completely against locator tool and keep in this position. Note: It is best to clamp fixture vertically in a vise to ensure that housing remains against locator tool.
5. Solder connector housing to cable. Avoid excessive heat. Immediately cool down and clean with alcohol.



insertion of dielectric bushing into connector housing:
1. Assure housing cavity is clean and dry.
2. Thread dielectric insert tool onto connector housing.
3. Place dielectric into rear opening of insert tool.
4. Using plunger, press dielectric fully through insert tool and into connector. Press until flange bottoms on tool housings.



inspect interface dimensions:
1. Center contact recession from reference plane to be .010" (.25mm) maximum.
2. Center contact protrusion from reference plane to be .000" maximum. No protrusion.
3. Dielectric protrusion from reference plane to be .002" (0.5mm) maximum.



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